

# A new version of MachineLibrary™ multimedia training package is now available



by Charlie Hatch

Machinery Diagnostic Training  
Engineer/Instructor III  
Bently Nevada Corporation  
e-mail: charlie.hatch@bently.com

**M**achineLibrary, Bently Nevada's CD-ROM-based, comprehensive, multimedia training package, is a joint production of the Bently Nevada Training Development Group and Bently Rotor Dynamics Research Corporation (BRDRC).

The original release of MachineLibrary contained over 40 interactive, animated training modules that provided an exciting and effective learning environment. These multimedia modules presented fundamental vibration and data presentation concepts, from the use of the Keyphasor® signals, to the construction and use of orbit, time-base, Bode, polar, and full spectrum plots.

The animation content, however, is only the beginning. The interactive material is supplemented by extensive illustrated, text-based, and printable information on rotor dynamics, machinery construction, and malfunction diagnosis, as well as special-purpose programs for rotor modeling, orbit synthesis, and full spectrum simulation.

To provide practical, hands-on practice, an extensive set of *Diagnostic*

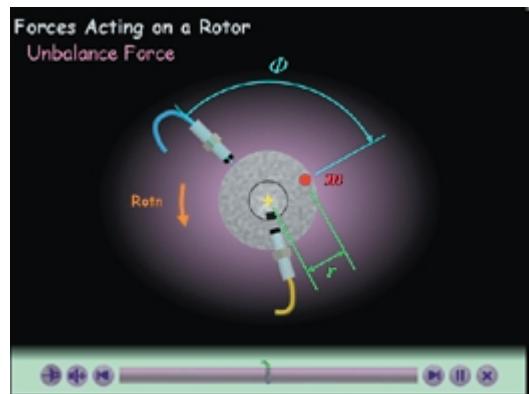
*Case Histories* is included, along with their associated ADRE® databases. These are databases from real machines that exhibit a wide range of malfunctions. A special version of ADRE for Windows (ADRE DMi) is included so you can view and manipulate data from these databases. ADRE DMi also contains a special Dynamic Modeling interface that allows you to enter rotor parameters, such as mass, damping,  $\lambda$ , and stiffness, and to view the predicted dynamic rotor vibration response.

## New in Release 2.0

Release 2.0 builds on the excellent foundation of our original MachineLibrary. We've improved it in a number of ways:

### New tutorial multimedia modules

MachineLibrary now includes new



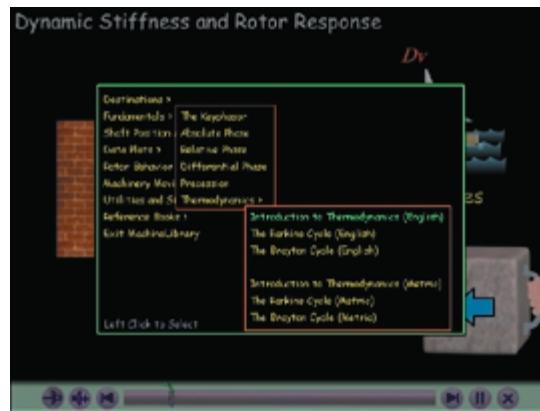
A scene from the new animated MachineLibrary module on the Unbalance Force. The module controls are at the bottom.

sets of tutorial multimedia modules on the Fundamentals of Rotor Behavior, Induction Motors, and Thermo-dynamics.

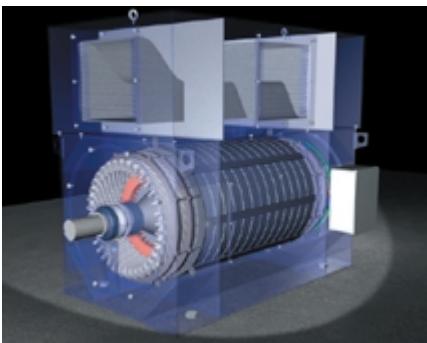
The new multimedia modules on Fundamentals include *The Spring Force*, *The Tangential Force*, *The Unbalance Force*, *The Damping Force*, *Lambda*, *The Rotating Fluid Force*, and *Dynamic Stiffness and Rotor Response*.

These multimedia modules explain, in detail, the origin of forces that affect rotor systems and how these forces interact to produce rotor vibration. In addition, a new, interactive *Rotor Response Simulator* is included that allows you to study how Dynamic Stiffness and rotor response change with speed.

Three new multimedia modules on squirrel-cage induction



The new navigation menu allows easy access to any location in MachineLibrary.



**3-D model of induction motor in the new MachineLibrary module on induction motor construction.**

motors cover *Construction, Operation, and Malfunctions*. These multimedia modules use sophisticated, 3-D animated cutaways to clarify and explain complex induction motor concepts, from basic magnetic field behavior, through construction details and operating principles, to diagnosis of typical malfunctions, including shorted rotor iron, tight air gap, broken rotor bar, and eccentric rotor iron.

The set of multimedia modules on Thermodynamics explains the basic Thermodynamic concepts of Enthalpy, Entropy, and the First Law of Thermodynamics. The modules also provide a detailed look at the operation of the Brayton cycle (gas turbines) and the Rankine cycle (steam turbines), and explain how to calculate the efficiencies of machines that use these cycles.

As an added bonus, MachineLibrary now contains an interactive module on malfunction diagnosis, the *Machinery Diagnostic Notebook*. This module starts with a basic symptom, "high vibration," and provides a step-by-step guide on how to analyze vibration data to arrive at a potential root cause malfunction.

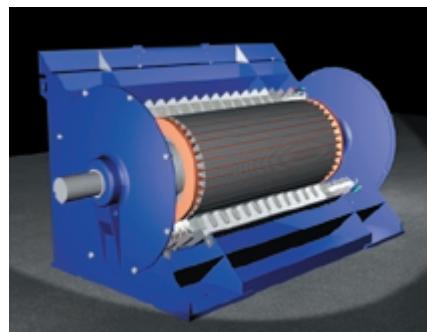
#### New articles

MachineLibrary now includes a major new article on Centrifugal Pumps. The more than 70-page, illustrated article

describes the design, operation, and malfunctions of centrifugal pumps in an easily understandable format.

In addition, there are six new illustrated articles on machinery malfunction diagnosis, including *Unbalance, Misalignment, Rotor-to-Stator Rubs, Fluid-Induced Instability, Shaft Cracks, and Rolling Element Bearings*. These articles start with easy-to-understand explanations of each malfunction, followed by recommended diagnostic procedures. These articles complement the *Machinery Diagnostic Notebook* mentioned above.

The latest release of MachineLibrary includes five new papers and articles by Bently Rotor Dynamics Research Corporation (BRDRC) that present research results in areas of fluid-induced instability, rotating stall in compressors, the use of forward response vectors in rotor balancing, and advanced shaft crack detection techniques.



**Cutaway of induction motor showing rotor bars and end rings.**

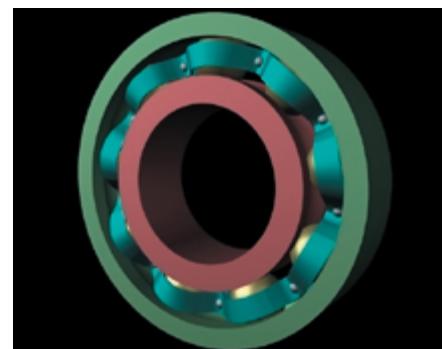
#### New navigation and control features

The navigation and control features of MachineLibrary have been completely redesigned. A new global navigation menu allows quick access to any part of MachineLibrary. All tutorial multimedia modules have controls that allow you to pause, step forward or backward, and easily and rapidly move to any location within a module. Learning

with these multimedia modules is now easier than ever.

#### Additional enhancements

For Release 2.0, the ADRE DMi rotor modeling interface has a new graphic interface that makes input of unbalance angle easy and intuitive. To improve cross platform readability, many MachineLibrary articles are now in .pdf format, and *Adobe Acrobat® Reader 4.0* is now included on the MachineLibrary CD-ROM.



**3-D model of rolling element bearing from the article on rolling element bearing malfunction diagnosis in MachineLibrary.**

Release 2.0 offers a host of enhancements and new features that make it an even more valuable learning and reference resource for the machinery management professional. At the same time, the interactive multimedia format makes it fun and easy to use. MachineLibrary will operate on Windows 95, 98, and NT computers. For more information, contact your nearest Bently Nevada sales or service professional. ☎